CLAIMS

1. An ultrasonic probe including a plurality of transducers in an array for converting drive signals into ultrasonic waves to transmit the waves to an object to be inspected and converting the waves into electrical signals to receive ultrasonic waves generated from the object, wherein

each of the transducers comprises a plurality of oscillation elements, each of the oscillation elements has a characteristic of changing an electromechanical coupling coefficient in accordance with strength of a direct-current bias applied by being superposed on the drive signal, and an electrode of each of the transducers is connected to a terminal provided with the drive signal.

2. The ultrasonic probe according to claim 1, wherein the plurality of oscillation elements are divided into a plurality of groups, and the electrode of each of the oscillation elements pertaining to a same group are commonly connected.

3. The ultrasonic probe according to claim 1, wherein the plurality of oscillation elements are divided into a plurality of groups in a minor-axis direction, and the electrode of each of the oscillation elements pertaining to

a same group are commonly connected.

4. The ultrasonic probe according to claim 1, wherein the plurality of oscillation elements are divided into a plurality of groups in a major-axis direction, and the electrode of each of the oscillation elements pertaining to a same group are commonly connected.

5. The ultrasonic probe according to claim 1, wherein the plurality of oscillation elements are formed at equal intervals, the oscillation elements are divided into a plurality of groups having an equal number of the oscillation elements, and the electrode of each of the oscillation elements pertaining to a same group are commonly connected.

6. The ultrasonic probe according to claim 1, wherein the plurality of oscillation elements are divided into a plurality of groups, a number of the oscillation elements pertaining to each of the divided groups increases for each group as the element gets closer a center of an ultrasonic aperture, and the electrode of each of the oscillation elements pertaining to a same group are commonly connected.

7. The ultrasonic probe according to claim 1, wherein the

terminal is connected to a power source through switching means.

8. The ultrasonic probe according to claim 1, wherein the oscillation elements are formed by a material including a semiconductor compound.

9. An ultrasonic imaging apparatus comprising: an ultrasonic probe according to claim 1; transmitting means for supplying drive signals to the oscillation elements of the ultrasonic probe; receiving means for processing electrical signals output from the oscillation elements; and image processing means for reconstructing an ultrasound image based on signals output from the receiving means; wherein bias means applying a direct-current bias on the oscillation elements by superposing the bias on the drive signal is connected to electrodes of the oscillation elements through the terminal.

10. The ultrasonic imaging apparatus according to claim 9, wherein the bias means includes a direct-current power source, distribution means for dividing a direct-current bias provided from the direct-current power source, and switching means for applying each direct-current bias supplied from the distribution means to electrodes of the

oscillation elements in accordance with a control command through the terminal.

11. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided into a plurality of groups, and the bias means applies a direct-current bias having different strength for each of the groups to each of the oscillation elements.

12. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided into a plurality of groups in a minor-axis direction, and the bias means applies a direct-current bias having different strength for each of the groups to each of the oscillation elements.

13. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided into a plurality of groups in a major-axis direction, and the bias means applies a direct-current bias having different strength for each of the groups to each of the oscillation elements.

14. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided

into a plurality of groups, and the bias means applies a direct-current bias increasing for each group as the elements gets closer a center of an ultrasonic aperture.

15. The ultrasonic imaging apparatus according to claim 9, wherein the bias means applies a direct-current bias to each oscillation element such that an electromechanical coupling coefficient of each of the oscillation elements increases as the element gets closer a center of a minor-axis direction.

16. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided into a plurality of groups, and the bias means selects the oscillation element to which a direct-current bias is applied for each group in accordance with a distance from the ultrasonic probe to an imaging portion.

17. The ultrasonic imaging apparatus according to claim 9, further comprising: storage means for storing signal strength of an ultrasonic wave transmitted from each of the oscillation elements and correction control means for generating a command to correct an electromechanical coupling coefficient of each of the oscillation elements based on the signal strength to a setting value, wherein the bias means applies a direct-current bias corrected based on

the correction command to each of the oscillation elements.

18. The ultrasonic imaging apparatus according to claim 9, wherein the bias means alternatively applies a direct-current bias applied to each of the oscillation elements when an ultrasonic wave is transmitted from each of the oscillation elements to the object, or applies a direct-current bias to each of the oscillation elements when ultrasonic waves generated from the object are received by each of the oscillation elements.

19. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided into a plurality of groups, and the bias means applies a direct-current bias having weight for each group symmetrically with respect to a center of an ultrasonic aperture in a minor-axis direction or in a major-axis direction to each of the oscillation elements.

20. The ultrasonic imaging apparatus according to claim 9, wherein the plurality of oscillation elements are divided into a plurality of groups, and the bias means applies a direct-current bias having weight for each group asymmetrically with respect to a center of an ultrasonic aperture in a minor-axis direction or in a major-axis

direction to each of the oscillation elements.

21. A method of ultrasonic imaging comprising:

a step for applying a direct-current bias to a plurality of oscillation elements possessed by each transducer arrayed in an ultrasonic probe and changing an electromechanical coupling coefficient of each of the oscillation elements to a setting value;

a step for supplying a drive signal to each of the oscillation elements by superposing the drive signal on the direct-current bias and transmitting an ultrasonic wave to an object to be inspected from each of the oscillation elements; and

a step for receiving an ultrasonic wave generated by the object by each of the oscillation elements to convert the wave into an electrical signal and reconstructing an ultrasound image based on the converted electrical signal.